K.Z. Morgan files at X-10

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Intra-Laboratory Correspondence
OAK RIDGE NATIONAL LABORATORY

To: K. Z. Morgan **Date:** February 28, 1950

From: A. D. Warden and J. C. Hart

Subject: Air Activity in 706-C and D Building

On the Iodine run which began last Monday, February 20th, we had what was probably the highest airborne activity together with the longest duration for some time. This prompted discussions between G. W. Parker and G. W. Tyler of the Chemistry Division, P. B. Orr, E. J. Witkowski, and E. King of the Operations Division, and A. D. Warden, J. C. Hart, and E. L. Sharp of the Health Physics Division. It was revealed that the half-life of the material involved was in the neighborhood of 18 minutes. This led us to believe that the isotope involved was Rb^{88}, a daughter product of Kr^{88} (3 hour half-life). Our suspicions were later more or less confirmed when we learned that the slugs which were being used had been pushed just a few hours before use. It was suggested that the use of "green" slugs in this operation be discontinued in favor of slugs which had been given at least a 30 hour ageing. Members of the Operations Division expressed the opinion that the loss in yield, approximately $12\frac{1}{2}\%$, would hinder their production effort.

J. C. Hart expressed the opinion for Health Physics that even though the production of I^{131} was extremely important to ORNL, the loss in yield was not as critical as the frequent instances of high air activity, the perils of which are well known as related to health hazard and Laboratory morale.

Mr. Witkowski stated that he would review production requirements and make an attempt to use aged slugs. This probably could be done when present orders are filled.

The possibility of a leak in the off-gas system was improbable in the opinion of P. B. Orr. The opinion was generally accepted that the cell gas which had been discharged through a short stack on top of 706-C Building was capable of causing the high air activity under favorable conditions. Since this system was to be tied into the 900 Area stack last week, it was agreed that the Iodine run of the week of February 27th would probably cause no difficulty.

A slight rise in air activity was detected in Building 706-C at approximately 2:12 P.M. on February 27th. The air activity continued to rise from this point on and the Buildings 706-C and D were evacuated at approximately 2:45 P.M. The activity had declined to the point where personnel were able to re-enter 706-C Building at 3:20 P.M. and 706-D Building at 3:40 P.M.

The highest air activity during this time as recorded by a Precipitron run on the 3rd level of Building 706-D between 2:45 P.M. and 3:00 P.M. was 2.6×10^{-8} uc/cc or approximately twice masking tolerance. During this time, the Constant Air Monitors located in Building 706-D were continually off the 20 K scale although the filters were changed constantly.

As soon as the activity was detected, members of the Operations and Health Physics Divisions started checking every possibility that would contribute to this abnormal rise in activity. During the latter part of the 8-4 shift, a leak was discovered in the off-gas line just outside 706-C Building. This condition was corrected, and it was thought that this might eliminate the trouble. However, the activity lasted intermittently throughout the 4-12 shift. The highest activity was on the 3rd level of Building 706-D. All during this time there was very little activity detected in Building 706-C.

During this time, a valve to the Rala equipment which ties into the 706-C and D off-gas system was found to be open. Due to the fact that the A-16 fan was shut down this valve should have been closed. The valve was closed off and the A-16 fan started in order to create a negative pressure on Cells A and B equipment. Soon after the valve was closed and negative pressure applied to the equipment, a gradual drop in the air activity was noted.

No air activity of any consequence was detected during the following 12-8 shift.

The cause of the air activity was attributed to the Iodine run which was in progress in Building 706-C during this time. The activity was detected as soon as the dissolving operation was underway. Decay curves were plotted on air samples taken and indications are that the material involved was Rb^{88} with an approximate 18 minute half-life.

Mr. Witkowski agreed this morning to write a complete report on the cause of yesterday's activity. It was his opinion that the difficulty was due almost entirely to leaks in the off-gas lines leading to the 200 Area off-gas stack. It is our opinion that the management should carefully consider the advisability of continuing the Iodine program with the present

equipment unless the Operations Division can show reasonable evidence to assure that the cause of the high air activity described above has been definitely located and rectified. We would suggest that discussions be held between yourself and L. B. Emlet for the purpose of gaining the support of management in setting up equipment and procedures designed to eliminate the problems discussed above. It is probable that budget and manpower considerations have been influential in creating the condition as it now exists.

ADW:JCH:cs